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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TORSTEN GERLICH, CHRISTOPHER KLATT,
RALF HEINRICH, and CHRISTOPH KLESEN

Appeal 2008-4144
Application 10/665,137
Technology Center 2800

Decided[1]: March 10, 2009

Before JOSEPH F. RUGGIERO, JOHN A. JEFFERY, and
KEVIN F. TURNER, *Administrative Patent Judges*.

TURNER, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134 from the non-final rejection of claims 1-8. We have jurisdiction under 35 U.S.C. § 6(b). We AFFIRM.

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[1] The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the decided date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

Appellants' claimed invention relates to a circuitry configuration for an electromagnetic regeneration valve actuatable by pulse-width modulation for venting a tank of a motor vehicle. (Spec. ¶ [0002]).

Claim 1 is illustrative of the invention and reads as follows:

> 1. An electromagnetic regeneration valve for venting a tank of a motor vehicle, the regeneration valve being actuatable by pulse-width modulation and having a pulsed mode and a proportional mode having a higher frequency than the pulsed mode comprising:
>
> a solenoid, and circuitry configuration including:
>
> a power source for supplying the solenoid with electricity;
>
> a control unit for generating pulse-width-modulated signals;
>
> a switching device, the solenoid capable of receiving the pulse-width-modulated signals of the control unit via the switching device; and
>
> a suppression device for suppressing high induced voltages at the solenoid, the solenoid in the proportional mode having a position corresponding to a mean current level.

(App Br.[2], Claims Appendix 1)

The Examiner relies on the following prior art references to show unpatentability:

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[2] We note that a first Appeal Brief was filed after a final rejection mailed on May 4, 2006, but the Examiner later reopened prosecution in a non-final rejection mailed November 30, 2006. A second Appeal Brief was then filed March 30, 2007 responsive to this non-final rejection; it is this latter Appeal Brief that we refer to in this opinion.

Butts	US 4,796,853	Jan. 10, 1989
Klotz	US 4,915,204	Apr. 10, 1990
Shacklock	US 5,231,722	Aug. 3, 1993
Maller	US 6,256,185 B1	Jul. 3, 2001
Busato	WO 99/06893 A1	Feb. 11, 1999

Paul Horowitz & Winfield Hill, *The Art of Electronics*, Cambridge Univ. Press (2d ed., 1989), at 52-53 & 63-64. (hereafter "Horowitz")

Claims 1-3, 7 and 8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Busato, Horowitz, and Shacklock.

Claims 5 and 6 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Busato, Horowitz, Shacklock, and Klotz.

Claim 4 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Busato, Horowitz, Shacklock, and Butts.

Claim 8 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Busato, Horowitz, Shacklock, and Maller.

Appellants argue that the solenoid controls in Busato were known, that the changes suggested by the Examiner in the rejection would not have been seen as needed and would have affected response time, and one of ordinary skill in the art would not have combined the references as proffered. (App. Br. 3-4). Appellants also argue that Horowitz teaches away from the invention and that there is no motivation to combine the references because they are directed to different types of circuitries. (App. Br. 4; Reply Br. 2-3). Appellants also raise separate arguments against the rejections of claims 4-6 and 8. (App. Br. 5). The Examiner responds that one of ordinary skill in the art would have made the modifications explained in the rejections, that the objections raised are against the references

individually, and that Appellants are arguing aspects of the invention that are not recited in the claims. (Ans. 8-14).

Rather than reiterate all of the arguments of Appellants and the Examiner, reference is made to the Briefs and the Answer for the respective details. Only those arguments actually made by Appellants have been considered in this decision. Arguments which Appellants could have made but chose not to make in the Briefs have not been considered and are deemed to be waived. *See 37* C.F.R. § 41.37(c)(1)(vii).

ISSUES

(i) Under 35 U.S.C. § 103(a), with respect to appealed claims 1-3, 7 and 8, would one of ordinary skill in the art at the time of the invention have found it obvious to combine Busato, Horowitz, and Shacklock to render the claimed invention unpatentable?

(ii) Under 35 U.S.C. § 103(a), with respect to appealed claims 5 and 6, would one of ordinary skill in the art at the time of the invention have found it obvious to combine Busato, Horowitz, Shacklock, and Klotz to render the claimed invention unpatentable?

(iii) Under 35 U.S.C. § 103(a), with respect to appealed claim 4, would one of ordinary skill in the art at the time of the invention have found it obvious to combine Busato, Horowitz, Shacklock, and Butts to render the claimed invention unpatentable?

(iv) Under 35 U.S.C. § 103(a), with respect to appealed claim 8, would one of ordinary skill in the art at the time of the invention have found it obvious to combine Busato, Horowitz, Shacklock, and Maller to render the claimed invention unpatentable?

FINDINGS OF FACT

The record supports the following findings of fact (FF) by a preponderance of the evidence.

1. The Specification describes a circuitry configuration for an electromagnetic regeneration valve actuatable by pulse-width modulation for venting a tank of a motor vehicle. (Spec. ¶ [0002]).
2. The Specification also provides: "[t]he use of free-wheeling diodes is a known process in valve engineering . . . [i]t is also known that this measure results in undesirable lengthening of the coil reaction time." (Spec. ¶ [0010]).
3. Busato is directed to a control for the output of a system in an automotive vehicle using an electric control signal having pulses. The control unit actuates a valve through a solenoid and a switching device. (Abstract; 14:27 to 15:26; Fig. 4, elements 26b, 46, and 113).
4. Busato discloses that the valve may be actuated by pulse width modulation in a pulsed mode and in a proportional mode having a higher frequency. (7:4-34).
5. Horowitz discusses the use of a suppression diode in parallel with an inductor when switching an inductive load. "Without the diode the inductor will swing the collector to a large positive voltage when the switch is opened, most likely exceeding the collector-emitter breakdown voltage. . . ." (p. 64, col. 1, ll. 21-30; Fig. 2.4).
6. With respect to diode protection, Horowitz also provides that the "only disadvantage of this protection circuit is that it lengthens the decay of current through the inductor. (p. 53, col. 1, ll. 1-3).

7. Shacklock discloses the use of pulse width modulation to control solenoid actuated valves to provide a proper mixture in a washing machine. (Abstract).
8. The solenoid in Shacklock is driven by a switching device and has a suppression device for suppressing high-induced voltages at the solenoid. The solenoid is actuated by a pulse width modulation at a frequency of 1 kHz. (Col. 15, ll. 9-35; Fig. 5, elements 72 and 74).
9. Klotz is directed to push/pull clutch apply piston in a motor vehicle, with a solenoid valve actuation system that is fed by the vehicle's electrical system. (Abstract; Fig. 27B).
10. Maller is directed to an electrical control module and circuit for controlling a solenoid. The control module includes a diode connected parallel to a power transistor to provide transient voltage protection. (Abstract; col. 7, ll. 40-42; Fig. 4, element Z3).
11. Butts is directed to a solenoid driver circuit actuated through pulse width modulation with an actuation frequency equal to 50 Hz. (Abstract; col. 5, ll. 14-21).

PRINCIPLES OF LAW

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness. *See In re Fine*, 837 F.2d 1071, 1073 (Fed. Cir. 1988).

> [T]here must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness' . . . [H]owever, the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.

KSR Int'l Co. v. Teleflex Inc., 127 S. Ct. 1727, 1741 (2007) (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

During examination, the claims must be interpreted as broadly as their terms reasonably allow. *In re Am. Acad. of Sci. Tech Center*, 367 F.3d 1359, 1369 (Fed. Cir. 2004). When the specification states the meaning that a term in the claim is intended to have, the claim is examined using that meaning, in order to achieve a complete exploration of the applicant's invention and its relation to the prior art. *In re Zletz*, 893 F.2d 319, 321-22 (Fed. Cir. 1989). "'Even when guidance is not provided in explicit definitional format, the specification may define claim terms by implication such that the meaning may be found in or ascertained by a reading of the patent documents.'" *Phillips v. AWH Corp.*, 415 F.3d 1303, 1321 (Fed. Cir. 2005) (citations and internal quotation marks omitted).

ANALYSIS

I. Obviousness over Busato, Horowitz and Shacklock

Claims 1-3, 7, and 8

Appellants argue that voltage suppression is not desirable because of adverse effects, described in Appellant's Specification, (FF 2), and Busato was not seen as needing suppression. (App. Br. 4). Appellants also allege that Horowitz confirms such teachings and teaches away from the combination of Horowitz with Busato and Shacklock. (App. Br. 4). The Examiner finds that such teachings are qualified and are dependent on the parameters of the circuit in question. (Ans. 8-9). We generally agree with the Examiner.

We find that both the statements made by Appellants, (FF 2), and those made by Horowitz, (FF 5 & 6), must be qualified. While the addition of a protective diode may increase reaction time, such a trait cannot be fatal in all applications. Similarly, we do not find Horowitz as advising that every inductor must have a suppression diode. Taken as general teachings, they represent different aspects of the common knowledge in electronics at the time of invention. We do not find the general teachings of Horowitz as requiring or forbidding the use of suppression diodes, and thus we do not find that Horowitz teaches away from a combination with Busato and Shacklock. We agree with the Examiner that Horowitz shows that one of ordinary skill in the art could have added a suppression diode in parallel to an inductor to protect a switch connected thereto.

Appellants also argue that Fig. 2.4 of Horowitz is related to load switching and not directed to pulse modulation where the lengthening of the current delay is clearly disadvantageous. (App. Br. 4). However, Shacklock, also applied, makes use of a diode for discharge (FF 8), so that the use of suppression devices for pulse width modulation signals was also known in the art at the time of the invention. Appellants attempt to draw a distinction between the proportional pulse width modulation signals of Shacklock and the pulse mode of the instant invention, (App. Br. 4), but we agree with the Examiner (Ans. 11) that both entail the use of different pulse widths. While Appellants allege that "free-wheeling diodes were <u>not</u> used for suppression of noise with pulse modulation," (Reply Br. 3), we have no evidence before us, save Appellants' arguments, that such a position is correct. As such, we are not persuaded that one of ordinary skill in the art would not have looked to Horowitz and Shacklock in modifying Busato.

In addition, Appellants allege that there is no motivation to combine Busato, Horowitz, and Shacklock because Shacklock is directed to a washing machine. (App. Br. 4). The Examiner explains that the motivation to combine Shacklock with Busato is the same as combining Horowitz with Busato, i.e. to protect the switching means. (Ans. 10). We do not find Shacklock to be nonanalogous art and we are satisfied with the motivation to combine Shacklock with Busato and Horowitz.

We note that Appellants have not addressed specific arguments to claims 2, 3, 7, and 8, dependent on claim 1. Accordingly, we conclude that Appellants have not shown that the Examiner erred in rejecting claims 1-3, 7, and 8 under 35 U.S.C. § 103(a) over Busato, Horowitz, and Shacklock.

II. Obviousness over Busato, Horowitz, Shacklock, and Klotz

Claims 5 and 6

Appellants argue that the rejection of claims 5 and 6 over Busato, Horowitz, Shacklock, and Klotz is improper based on the arguments raised against Busato, Horowitz, and Shacklock. (App. Br. 5). As we have discussed *supra*, we find no error in the combination as applied to claim 1.

Appellants also argue that since Shacklock is directed to washing machine controllers, it is not pertinent to claims 5 and 6. (App. Br. 5). However, since Klotz and Busato are both directed to automotive applications and we have addressed the pertinence of Shacklock *supra*, we do not find Appellants arguments to be compelling.

In addition, Appellants argue that the motivation supplied by the Examiner to combine the references "is not understood for this rejection and *is in clear error*." (App. Br. 5). The Examiner's motivation refers to

Maller, although Maller was not asserted in the rejection of claims 5 and 6. While the Examiner does not appreciate the error, (Ans. 13), we find that the clear intent of the motivation statement, (Ans. 6), was to refer to Klotz, and not to Maller. Applying the motivation to Klotz, i.e. substantially expanding the market of the Klotz control system manufacturer, is consistent with the references cited and creates a proper motivation to combine the cited references. Thus, we find the juxtaposition of the Maller and Klotz references in the motivational statement to be harmless error.

Accordingly, we conclude that Appellants have not shown that the Examiner erred in rejecting claims 5 and 6 under 35 U.S.C. § 103(a) over Busato, Horowitz, Shacklock, and Klotz.

III. Obviousness over Busato, Horowitz, Shacklock, and Butts

Claim 4

Appellants argue that the rejection of claim 4 over Busato, Horowitz, Shacklock, and Butts is improper based on the arguments raised against Busato, Horowitz, and Shacklock. (App. Br. 5). As we have discussed *supra*, we find no error in the combination as applied to claim 1.

Appellants also argue that Butts is not pertinent to the problem of providing a proportional and pulse control of the solenoid valve because Butts appears to have only pulse width modulation control, and does not disclose two modes. (App. Br. 5). The Examiner responds that Butts does teach two modes: shifting and non-shifting, as illustrated in Figs. 3 and 4. (Ans. 12). We concur and additionally agree with the Examiner that Butts may also be relevant to the current claims because Butts is concerned with

solenoid driving with the use of voltage protection means. (Ans. 13). As such, we do not find Appellants argument to be compelling.

In addition, Appellants argue that no motivation to combine Butts with Busato, Horowitz, and Shacklock has been supplied. (App. Br. 5). However, we agree with the Examiner that the Examiner has shown that the switching frequency is an effective variable and may be optimized without being inventive. (Ans. 13). As such, we find no error in the motivation supplied by the Examiner.

Accordingly, we conclude that Appellants have not shown that the Examiner erred in rejecting claim 4 under 35 U.S.C. § 103(a) over Busato, Horowitz, Shacklock, and Butts.

IV. Obviousness over Busato, Horowitz, Shacklock, and Maller

Claim 8

Appellants argue that the rejection of claim 8 over Busato, Horowitz, Shacklock, and Maller is improper based on the arguments raised against Busato, Horowitz, and Shacklock. (App. Br. 5). As we have discussed *supra*, we find no error in the combination as applied to claim 1.

Appellants also argue that no motivation to combine Maller with Busato, Horowitz, and Shacklock was supplied in the Office Action. (App. Br. 5). A cursory examination of the rejection of claim 8, (Ans. 7), reveals that the Examiner has disclosed the deficiencies of Busato, Horowitz, and Shacklock with respect to claim 8, i.e. no protecting diode connected in parallel to the power transistor, and that Maller discloses such a diode. The Examiner supplies a motivation to provide such a diode from Maller and

suggests a similar motivation to apply a similar diode in Busato. We can find no error in the rejection.

Accordingly, we conclude that Appellants have not shown that the Examiner erred in rejecting claim 8 under 35 U.S.C. § 103(a) over Busato, Horowitz, Shacklock, and Maller.

CONCLUSION

The decision of the Examiner rejecting claims 1-3, 7, and 8 under 35 U.S.C. § 103(a) as being unpatentable over Busato, Horowitz, and Shacklock, rejecting claims 5 and 6 over Busato, Horowitz, Shacklock, and Klotz, rejecting claim 8 over Busato, Horowitz, Shacklock, and Maller, and rejecting claim 4 over Busato, Horowitz, Shacklock, and Butts is affirmed.

DECISION

The Examiner's rejections of claims 1-8 before us on appeal are affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

rvb

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